REMARKS

Claims 1-40 were pending. Of these, claims 1-17, 20-37 and 40 were rejected. Claims 18, 19, 38 and 39 are indicated as allowable if rewritten independent form including all of the limitations of the base claim and intervening claims. By the above amendments, claims 31 and 32 are amended and claims 3 and 23 are canceled. The Applicants respectfully request further examination and reconsideration in view of the amendments above and remarks below.

Amendments to the Specification:

The applicants have amended the specification at page 1, lines 5-12, to add the serial numbers and filing dates of the referenced applications. The applicants have also amended the specification at page 1, lines 22-27, delete a sentence which contains a typographical error. In addition, the applicants have amended the specification at page 5, lines 14-26, to correct a typographical error. No new matter has been entered.

Rejections under 35 U.S.C. § 112:

Claims 31 and 32 were rejected as lacking antecedent basis for "[t]he computer readable memory of claim 9." The office action stated that these claims were treated as being dependent from claim 29. The applicants have amended claims 31 and 32 to be dependent from claim 29.

Claims 3 and 23 were rejected as failing to provide further limitation. The applicants have canceled claims 3 and 23.

Rejections under 35 U.S.C. § 103:

Claims 1 and 21 were rejected under 35 U.S.C. § 103 as being obvious over U.S. Patent No. 5,993,038 to Sitbon et al. (hereinafter "Sitbon") in view of U.S. Patent No. 5,734,825 to Lauck et al. (hereinafter "Lauck"). Particularly, regarding claims 1 and 21, the office action alleges that Sitbon discloses: "forming an objective" (in col. 3, line 66, to col. 4, line 4); and "employing a local search solution to solve an integer program comprising the communication constraints and the objective, which determines the placement of the services onto the nodes" (in col. 3, line 66, to col. 4, line 4). The office action states that Sitbon is silent on "forming communication constraints between node pairs which ensure that a sum of transport

demands between a particular node pair does not exceed a transport capacity between the particular node pair, each term of the sum comprising a product of a first placement variable, a second placement variable, and the transport demand between the services associated with the first and second placement variables." However, the office action alleges that Lauck discloses these features (in col. 3, line 66, to col. 4, line 14 and col. 5, lines 26-38) and that "[i]t would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Sitbon by ensuring that communications between nodes do not exceed transmission capacity as taught by Lauck in order to avoid overloading a line for the purposes of avoiding packet loss."

The applicants respectfully traverse the rejection. As explained fully below, the applicants submit that it would not have been obvious to combine Sitbon and Lauck in the manner suggested in the office action, and, even if combined, the the Sitbon and Lauck references do not teach or suggest all of the limitations of applicants' claim 1.

Sitbon is directed toward balancing the load of a distributed application among machines of a distributed processing system. The tool includes a master daemon running on one of the machines and a plurality of agent daemons running on other machines. The master and each of the agents calculate the load of the machine on which they are running. The master collects all of the load data and sends the data to all of the agents. At the request of the distributed application, the local agent closest to the application indicates to the application which machine has the lightest load. The application then requests the machine with the lightest load to execute the services the application requires. See Abstract of Sitbon and col. 3, line 66, to col. 4, line 4.

Lauck discloses a rate-based, end-to-end flow control system for a communications network. The system includes each source end station selecting its transmission rate from a set of permitted discrete transmission rates. The set of permitted discrete transmission rates is based on a logarithmic encoding. The disclosed rate-based traffic control system further requires each source end station to send one end-to-end control cell every time period T. The time period T is also known by switches in the communications network, and is used to periodically calculate an available allocation (or "fair share") of bandwidth at a switch for a given virtual circuit. See Abstract of Lauck.

Lauck further discusses that the transmission rates are selected by defining feasible rates as "a transmission rate for each source station such that the sum of all transmission rates of all virtual circuits passing through a link do not exceed the capacity of the link, for all links in the network." Lauck at col. 3, line 66, to col. 4, line 5.

In order to properly combine the references, there must be some reason that a person of ordinary skill in the art would make the combination. Here, Sitbon is directed toward balancing a load of a distributed application by selecting a machine having the lightest load for assigning a required service. Lauck is directed toward a flow control system in a communications network. Therefore, Sitbon and Lauck are clearly directed toward different problems and present solutions that are unrelated to each other. For at least this reason, it would not have been obvious to combine Sitbon with Lauck.

Further, there is not a teaching in either reference that Sitbon would benefit from the teachings of Lauck. Specifically, Sitbon teaches that the load for each machine is calculated using a formula that takes into account the utilization of the network by the node. See Sitbon at col. 4, line 62, to col. 5, line 15. Therefore, because Sitbon already takes network loading into account, there would not be a reason to look toward Lauck for defining transmission rates among stations.

There is also no teaching Sitbon or Lauck as to how Sitbon might make use of the transmission rates as defined by Lauck. This is clear because Sitbon only looks to the comparative loading on the machines to determine which machine has the lightest load and, thus, should receive an additional assignment of services to be executed. There is no teaching or suggestion in either reference as to how the transmission rates as defined by Lauck might be used to determine which machine of Sitbon has the lightest load or which machine should receive an additional assignment of services.

For at least these reasons, the applicants respectfully submit that Sitbon and Lauck are not properly combinable. Therefore, claims 1 and 21 are allowable over Sitbon and Lauck.

Further, the applicants respectfully submit that, even assuming that Sitbon and Lauck could be properly combined, such a combination does not disclose all of the limitations of applicants' claim 1 or 21.

For example, claims 1 and 21 both recite "employing a local search solution to solve an integer program comprising the communication constraints and the objective,

which determines the placement of the services onto the nodes." An integer program is a type of optimization problem in which integer variables are defined, one or more constraints are applied and values for the variables are determined in an effort to maximize one or more objectives. Integer programs are described in the literature. See, for example, "A Comparison of Two Methods for Solving 0-1 Integer Programs Using a General Purpose Simulated Annealing Algorithm" by Abramson, et al. and "Domain-Independent Local Search for Linear Integer Optimization" by Walser, both of which were cited by the applicants in the Information Disclosure Statement submitted on July 25, 2003.

The applicants' invention, as recited in the independent claims, is a novel method of determining a placement of services of a distributed application onto nodes of a distributed resource infrastructure including steps of forming and solving an integer program. Claims 1 and 21, recite "employing a local search solution to solve an integer program...". The integer program of claims 1 and 21 is formed by the steps of "forming communication constraints..." and "forming an objective...".

Neither Sitbon, nor Lauck discloses forming or solving an integer program. The office action alleges that Sitbon discloses an integer program at col. 3, line 66, to col. 4, line 4. The applicants disagree. This portion of Sitbon merely discusses determining which machine has the lightest load. From col. 4, line 58, to col. 5, line 20, of Sitbon, it can be seen that each load is calculated from a weighted sum. The loads are then compared to determine which is lightest. There is no teaching or suggestion in Sitbon that such determination is made using integer programming techniques. Therefore, this is another reason why claims 1 and 21 are allowable.

Further, it should be noted that claims 1 and 21 each recite that the integer program "includes the communication constraints and the objective." The office action alleges that the recited "communication constraints" are taught by Lauck and that the recited "objective" is taught by Sitbon. As discussed above, neither Sitbon, nor Lauck teaches the use of an integer program. Accordingly, the references, even in combination, cannot teach solving an integer program that includes both the recited communication constraints and the recited objective. This is another reason why claims 1 and 21 are allowable.

The Sitbon and Lauck references also do not teach or suggest how such an integer program that includes both the recited communication constraints and the recited objective might be employed to determine the placement of the services onto

the nodes. Sitbon teaches that when additional services are required by the distributed application, all of those services are assigned to the one machine that has the lightest load. In order to place different services onto a different machine, the calculation of which machine has the lightest load would need to be repeated. In contrast, the applicants' invention as recited in claims 1 and 21 recites that the solving of the integer program places multiple services onto multiple nodes. This is another reason why claims 1 and 21 are allowable.

Claims 2-6, 13-17, 22-26 and 33-37 were rejected under 35 U.S.C. § 103 as being obvious over Sitbon in view of Lauck and further in view of U.S. Patent No. 6,507,844 to Leymann et al. (hereinafter "Leymann"). Particularly, regarding independent claims 2 and 22, the office action essentially repeats the same allegations regarding Sitbon and Lauck. The office action further states that Sitbon and Lauck do not disclose "forming an integer program that comprises: a set of placement variables for a combination of the services and the nodes, each of the placement variables indicating whether a particular service is located on a particular node." However, the office action alleges that Leymann teaches this feature (at col. 4, lines 53-65) and that it would have been obvious to incorporate this feature into the combination of Sitbon and Lauck "in order to track the placement of services for the purposes of communicating the location of services to nodes and doing so in a way that minimizes network traffic (Leymann, Col. 4, ln. 53-65)."

The applicants respectfully traverse the rejection. First, the rejection relies upon the combination of Sitbon and Lauck as it basis. As explained above, Sitbon and Lauck are not properly combinable. Leymann does not cure this deficiency in Sitbon and Lauck. Accordingly, Sitbon and Lauck are also not combinable with Leymann.

Further, the applicants submit that there would not have been a reason for a person of ordinary skill in the art to combine Leymann with Sitbon and Lauck. Leymann is directed toward a method of minimizing network traffic of distributed applications operating in a distributed environment in a networked computer system. The system comprises a plurality of workstations and a plurality of database management systems (DBMS) managing data in a set of distributed tables for use by the workstation. The method of Leymann derives from process models a placement of tables resulting in minimal network traffic when the process model is executed to lower costs and average response times. See Abstract of Leymann.

It is clear from Leymann that the placement of tables is determined by modeling business processes. See Leymann at col. 5, line 43, to col. 9, line 39, where Leymann extensively describes the modeling of business processes. Neither Sitbon, nor Lauck employs modeling of business processes. Therefore, the process models disclosed by Leymann are unrelated to the teachings of Sitbon and Lauck. Accordingly, there would not have been a reason to combine Leymann with Sitbon or Lauck.

For at least these reasons, claims 2-6, 13-17, 22-26 and 33-37 are allowable over Sitbon, Lauck and Leymann.

In addition, Leymann does not suggest or disclose using an integer program. Instead, Leymann employs process models. And, as explained above, Sitbon and Lauck also do not disclose integer programming techniques. In contrast, claims 2 and 22 each recite "forming an integer program" and "employing a local search solution to solve the integer program." Therefore, this is another reason why claims 2-6, 13-17, 22-26 and 33-37 are allowable over Sitbon, Lauck and Leymann.

Further, claims 2 and 22 each recite that the integer program comprises "a set of placement variables for a combination of the services and the nodes, each of the placement variables indicating whether a particular service is located on a particular node." Because Leymann does not disclose an integer program, Leymann cannot disclose an integer program having the particular placement variables recites in claims 2 and 22.

The office action alleges that at col. 4, lines 53-65, Leymann discloses the recited placement variables by its teaching that a placement of tables is derived from the process models. However, the applicants have studied Leymann and can find no such teaching of placement variables indicating whether a particular service is located on a particular node, as recited in applicants' claims 2 and 22.

These are additional reasons why claims 2-6, 13-17, 22-26 and 33-37 are allowable over Sitbon, Lauck and Leymann.

Claims 7-11, 20, 27-31 and 40 were rejected under 35 U.S.C. § 103 as being obvious over Sitbon in view of Lauck and Leymann and further in view of U.S. Patent No. 5,878,224 to Smith (hereinafter "Smith").

The applicants respectfully traverse the rejection. Claims 7-11 are dependent from an allowable base claim 2. For at least this reason claims 7-11 are allowable.

Claims 27-31 are dependent from an allowable base claim 22. For at least this reason, claims 27-31 are allowable over Sitbon, Lauck, Leymann and Smith.

Regarding independent claims 20 and 40, the office action states that they are rejected in view of Sitbon, Lauck and Leymann, as previously applied and further in view of Smith. Therefore, the rejection relies upon the combination of Sitbon, Lauck and Leymann as it basis. As explained above, Sitbon, Lauck and Leymann are not properly combinable. Smith does not cure this deficiency. For at least this reason, claims 20 and 40 are allowable over Sitbon, Lauck, Leymann and Smith.

Claims 12 and 32 were rejected under 35 U.S.C. § 103 as being obvious over Sitbon in view of Lauck, Leymann and Smith and further in view of U.S. Patent No. 6,928,482 to Ben Nun (hereinafter "Ben Nun").

The applicants respectfully traverse the rejection. This rejection also relies upon the combination of Sitbon, Lauck and Leymann as it basis. As explained above, Sitbon, Lauck and Leymann are not properly combinable. Smith and Ben Nun do not cure this deficiency. For at least this reason, claims 20 and 40 are allowable over Sitbon, Lauck, Leymann, Smith and Ben Nun. Further, claims 12 and 32 are dependent from allowable base claims 2 and 22, respectively. For at least these reasons, claims 12 and 32 are allowable

Respectfully Submitted,

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